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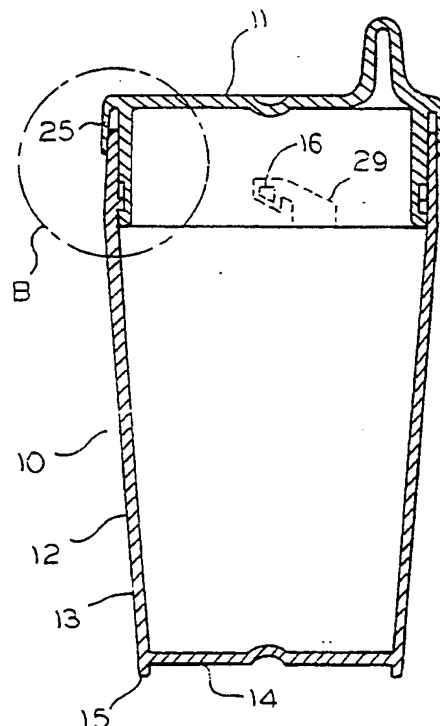
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(54) Title: CLOSURE SYSTEM FOR COVERED RECEPTACLES AND THE LIKE

(57) Abstract

A child's drinking cup (10) has a lid (11) combining positively inter-engaging latches (29) with a biasing feature which forces the lid (11) upward with respect to the container (12) in order to more firmly effect latching. A series of projections (16) formed along the interior upper periphery of the container register with latching slots (29) formed along the outer surface of a skirt (26) which depends from the lid (11), which is dimensioned to fit closely within the opening of the container (12). An annular flange (25) extends from the outermost periphery of the lid to overlap a portion of the skirt (26). The outer upper periphery of the container is tapered outwardly to force the flange (25) to flex when the lid (11) is placed on the container (12) thus imparting an upward force to the lid (11) and, thereby, to the lug-and-latch combinations when the lid is turned to register the lugs (16) with the latches (29).



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CLOSURE SYSTEM FOR COVERED RECEPTACLES AND THE LIKE

This invention relates to closure systems for covered receptacles and interconnecting systems for cylindrical members and, more particularly, to a lid-and-cup combination with an interconnection feature which makes the lid difficult for infants and children to remove, yet which allows adults to simply and effectively remove the lid to clean or fill the receptacle or to remove items such as medication from it.

Drinking cups for infants and children are old and well-known. Such cups are sometimes referred to as "training cups" and are intended to be the next step beyond the use of a baby bottle to teach children to drink from a glass or cup.

Such drinking cups typically include a container, or "tumbler" portion which holds the liquid and a cover which attaches to the tumbler and which covers all or most of the opening of the tumbler. Use of the cover is intended to minimize spills which may otherwise occur when the child drops or upsets the cup and allow the child to tip the cup upward to a drinking position without having the entire contents of the cup pour out all at once. Examples of such cups are shown in already-issued United States Patents.

For example, United States Patent 2,640,337 (Bryant) shows a baby cup having a lid which covers a substantial portion of the tumbler opening and has a hole through which the child may drink. United States Patent 2,765,632 (Bryant) shows generally the same type of cup with a cover that entirely closes off the tumbler opening with the exception of a passage through which the child may drink.

United States Patent D. 216,730 (Carslaw) and United States Patent D. 233,972 (Juhlin) both show drinking cups having lids which completely close off the tumbler opening, with each lid having a spout through which the child can drink. Both of these references also

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show the use of handles attached to the outer periphery of the cup to provide a convenient hand grip for the child. A similar construction is shown in United States Patent 2,792,696 (Stayart) showing a cup with handles and with a cover that completely closes off the tumbler opening.

United States Patent 3,412,892 (Waksman, et al.) shows a cup with a lid having a drinking opening that may be selectively opened or closed. United States Patent 4,850,496 (Rudell et al.) shows a drinking cup having a tumbler with external screw threads formed at its uppermost periphery and a series of interchangeable lids which may be attached to the top of the cup, with the lids varying from a nipple-like arrangement to a collar which approximates an open-mouthed cup. United States Patent 4,600,111 (Brown) shows another cup construction which uses a threaded collar to hold different cup covers in place, allowing the cup to be used in configurations ranging from a baby bottle to a training cup.

United States Patent 4,121,731 (Okerstrum) shows a child's drinking cup having a pair of handles which must be squeezed inwardly in order to open the lid closure to allow a child to drink from the cup.

One common characteristic of such cups is that the efficacy of the cup will be completely destroyed should the child learn how to remove the lid, allowing the liquid inside to spill either when the cup is upset or during the child's attempts to drink from the cup without fully having learned to do so. If the lid is too easy to remove, the cup's usefulness as a training device is extremely limited. If the lid is too difficult to remove, this will discourage the use of the cup by adults who will find it inconvenient or awkward to open the cup to put liquid in it, or to wash the cup.

The concept of producing a container with a lid more easily removable by an adult than a child is also well represented in the prior art by patents drawn to

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child-resistance closures for securing containers which contain drugs, medicines or such potentially hazardous or poisonous substances as cleaning fluids.

Typical and representative of such devices is United States Patent 4,429,800 (Greenspan) which shows a container and lid combination. The lid may be removed only upon the simultaneous depression of a pair of tabs on the lid and these tabs are sized and spaced to make it much easier for an adult to manipulate them than a child. United States Patent 4,087,016 (Towns et al.) shows a safety cap which must be rotated with respect to the container to a predetermined position before the cap can be disengaged from the container.

United States Patent 4,807,768 (Gach) shows a snap-cap which, when closed, requires the simultaneous compression of a pair of oppositely-disposed tabs to enable the cap to be opened. United States Patent 4,830,206 (Fisher) describes a tamper-resistant container having a lid with a pair of internally-extending ears which interconnect with a pair of hooks formed on the interior of the container. In order to release the hooks, a specific portion of the lid's periphery must be compressed while the container is simultaneously twisted or rotated with respect to the lid. United States Patent 4,442,945 (Sandhaus) shows a safety closure having both a locking and non-locking mode so that the user may select which mode is appropriate.

United States Patent 4,345,691 (Burke) shows a closure for spray containers or other types of dispensing bottles with an anti-opening mechanism which is not designed to be defeated, thus making it possible to assemble a spray bottle with a spray top which cannot be removed.

Another feature which is described in the prior art with respect to safety closures is the type of closure that has a series of interconnecting latches, typically

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engaged when the lid of the container is rotated with respect to the container. Several such constructions use a biasing element to urge the lid upward, that is, away from the container to enhance the positive latching feature. Thus, the biasing of the lid or cover forces the mating portions of the latch more tightly together.

United States Patents 4,526,281 (Herr) and 4,053,078 (Herr) teach and describe a closure having lugs formed on the interior of the cover which interengage with hooks or latches formed on the outer periphery of the container. Biasing of the lid with respect to the container is accomplished by either a fitment spring or by pressure exerted by the uppermost portion of the container against the lid.

United States Patents 4,059,189 (Mumford) and 4,383,619 (Mumford et al.) illustrate a closure having a similar arrangement, with the interior periphery of the lid having a number of lugs formed thereon which mate with projections formed on the outer upper periphery of the container. A separate liner is placed across the container opening to act as a biasing element forcing the lid upward with respect to the container when the lugs are engaged with the projections.

United States Patent 4,627,547 (Cooke) shows a container having a lid with hook elements positioned around the inner periphery with mating latch elements positioned around the outer upper periphery of the container. A resilient pad or liner is inserted into the lid which is then compressed against the container when the lid is forced down and twisted in order to engage the mating hook members.

United States Patent 4,834,251 (Yu) shows a medicine bottle having a measuring cup which attaches over the cover for the bottle. The base of the cup is formed with a convex section which, when placed over the opening to the bottle, is compressed. A series of projections is

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formed on the outer periphery of the bottle which mate with corresponding latch elements formed on the interior of the measuring cup. The biasing force exerted when the concave bottom of the measuring cup contacts the bottle cover serve to hold the latching mechanisms in closer engagement.

A child's drinking cup has a container used for holding the liquid to be fed to the child and a lid used to close off the opening of the container. A series of lugs is formed on the interior of the container. The lid has a skirt depending therefrom and extending into the interior of the container. Latch members are formed on the outer surface of the skirt and are sized and positioned to register with the lugs when the lid is rotated with respect to the container. A depending flange is formed on the lid coaxial with and uniformly spaced from the depending skirt. The flange is shaped and dimensioned to flex outwardly and the upper outer periphery of the container is formed with a ramp which forces the flange to flex outwardly from the skirt when the upper outer periphery of the container is placed within the annular space formed between the lid and the skirt and the lid is forced downward onto the container. The lid is formed from a thermoplastic material having a memory which urges the flange to return to its original, unstressed position. The force exerted by this flexing of the flange causes the lid to be urged in an upward position away from the container and this upward biasing force helps to seat the lugs in the latch members. The latching feature may be defeated by pressing the lid downward sufficiently to allow the lugs to release the latch members and then rotating the lid with respect to the container in order to move the lugs out of register with the latches. Once this is done, the lid may be lifted vertically and removed.

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These and other features of the present invention may best be understood upon consideration of the accompanying drawings, wherein:

Figure 1 is a sectional view of the present invention showing the lid assembled to the container;

Figure 2 is a sectional view of the container showing the latching projections formed therewithin;

Figure 3 is a side elevation of the lid of the present invention showing the latches formed thereon;

Figure 4 is a top view of the lid shown in Figure 3;

Figure 5 is a sectional view of the lid shown in Figure 3;

Figure 6 is an enlarged detail of the circled area in Figure 1 showing the lid flange in both its flexed and unflexed positions;

Figure 7 is a variation of Figure 2 showing a disk-shaped lug and a rounded latch;

Figure 8 is another variation of Figure 2 showing a lug formed as a spherical section and a rounded latch; and

Figure 9 is another embodiment showing the present invention adapted to interconnect lengths of piping.

Referring now to Figure 1, the numeral 10 indicates generally a sectional view of a preferred embodiment of the present invention used as a closure for a child's drinking cup as described and claimed herein. Cup 10 consists generally of a lid 11 attachable to a container or tumbler 12 which can be filled with a drink for the child. As shown in Figure 1, container 12 is formed with a cylindrical, upstanding sidewall 13 attached integrally and liquid-tightly to a bottom 14. In one preferred embodiment, shown in Figure 1, bottom 14 is offset from lower lip 15 of container 12, while, in Figure 2, another preferred embodiment is shown with bottom 14

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joined to sidewall 13 at the lowermost extremity of sidewall 13.

As shown in Figure 2, a series of lugs 16 are formed on interior wall surface 17 of container 12. In the embodiment shown herein, lugs 16 are preferably formed as right triangles spaced radially equidistantly about the interior of container 12 and at an identical distance D from lip 18 of container 12. Each lug 16 is formed with a ramp 19, included at an angle from the horizontal, and a stop 20 extending in a generally downward direction. Lugs 16 are formed and positioned to enter and engage with latches formed on lid 11, to be described hereinafter in greater detail.

Figure 3 is a lateral elevational view of lid 11. In a preferred embodiment, both container 12 and lid 11 are circular in cross-section. As best seen in Figure 3 and Figure 4 (a bottom view of lid 11 as viewed along line 4-4 in Figure 3), lid 11 has a drinking spout 21 formed integrally therewith with a series of drinking apertures 22 formed on upper spout surface 23 through which the drink placed in container 12 can be ingested when lid 11 is assembled to container 12.

As best seen in Figure 3, lid 11 has a top 24 formed integrally with drinking spout 21, and a depending flange 25 which, in this preferred embodiment, extends about the entire periphery of lid 11. As best seen in Figure 3 and Figure 5, lid 11 also includes a depending skirt 26 formed integrally with top 24 and flange 25. Figure 5 is a sectional view of the lid shown in Figure 3, taken along line 5-5 of Figure 4. As seen in Figure 3 and Figure 5, skirt 26 has a smaller cross-sectional diameter than flange 25 and is sized to fit within mouth 27 of container 12 such that outer skirt surface 28 contacts interior wall surface 17 in a manner to be described more fully hereinafter.

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As best shown in Figure 3, lid skirt 26 has formed thereon a number of latching notches 29 formed beneath skirt surface 28. In a preferred embodiment, one such latch 29 is positioned to interengage each lug 16. Each latch 29 has an entry 30 extending upward to upper latch wall 31 and, thereafter, laterally toward latch end wall 32. Lower latch wall 33 extends from latch end wall 32 and terminates in latch stop 34, formed with an upper latch stop surface 35. Both lower latch wall 33 and upper latch stop surface 35 are preferably formed with approximately the same angle of inclination as lug ramp 19. Each latch 29 is thus formed as a blind channel with its entry 30 commencing at the lowermost edge of skirt 26, as shown in Figure 5.

The interengagement of lugs 16 and latches 29 may be described as follows. Lid 11 is turned to align one latch entry 30 with each lug 16. After such alignment has been effected, lid 11 is pressed downwardly onto container 12 such that outer skirt surface 28 of skirt 26 slides along interior wall surface 17 of container 12 until each lug 16 has contacted its corresponding upper latch 31. At that point, lid 11 is rotated with respect to container 12 to bring each lug 16 past latch stop 34 such that lug ramp 19 registers with lower latch wall 33. It is contemplated that during this process, lug ramp 19 may contact upper latch stop surface 35 to create a camming action forcing lid 11 downward or toward container 12. When lug 16 is fully registered with latch 29, the engagement of lug 16 with latch end wall 32 will prevent lid 11 from being rotated any further. The engagement of latch stop 34 and lug stop 20 will prevent the removal of lid 11 from container 12.

To defeat the latching action of lugs 16 and latches 29, lid 11 must be pushed downward toward container 12 to elevate lug 16 above latch stop 34. Thereafter, lid 11 may be rotated with respect to

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container 12 and, when each lug 16 is aligned with entry channel 30, lid 11 may be lifted upward and removed from container 12.

In order to impart a more positive locking action, it is desirable to apply an upward biasing force to lid 11 in order to more firmly and positively seat lug 16 in latch 29. In a preferred embodiment of the present invention, such an upward biasing force is created by a unique interaction of the upper lateral surface of container 12 with lid 11.

As best seen in Figure 4 and Figure 5, lid flange 25 is spaced apart a selected distance from skirt 26. Lid 11 and container 12 are preferably formed from an injection moldable thermoplastic material such as polyethylene or polypropylene having a "memory" that is, a natural tendency to return to its original shape once flexed or stressed. Flange 25 thus forms an annular "living hinge" 36 at the outermost periphery of lid top 24. Hinge 36 allows flange 25 to flex with respect to lid skirt 26. To enable the lowermost portion of flange 25 to flex more easily, flange 25 is formed with a tapered cross-sectional configuration such that flange 25 is thicker at its uppermost portion 37 than it is at flange edge 38. An annular flange channel 39, as shown in Figure 4 and Figure 5, is thereby defused between skirt 26 and flange 25, and is sized to accept container lip 18 there within.

Referring to Figure 2, it can be seen that the uppermost periphery of container 12 is formed with a cross-sectional thickness which varies as follows. Sidewall 13 is tapered outward beginning at container lip 18 at an angle A with respect to interior container wall surface 17. In a preferred embodiment, angle A is about seven degrees. A maximum thickness T of sidewall 13 is selected to force lid flange 25 to flex outwardly when flange channel 39 is aligned with container lip 18 and is

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forced downward or toward container 12. The tendency of lid flange 25 to return to its unstressed position causes a force which tends to move lid 11 upward or away from container 12 along the tapered portion of sidewall 13. In order to secure lid 11 to container 12, lid 11 must be pushed downward with sufficient force to overcome the tendency of lid 11 to move in a direction away from container 12, and thereby rotated to engage lugs 16 with latches 29.

When lid 11 is secured to container 12 as described hereinabove, it can be seen that this upward force will press lug ramp 19 into contact with lower latch wall 33 thus providing a more positive interconnection. Figure 1 illustrates the interconnection of lid 11 with container 12 and the flexing outwardly of flange 25 at detail B. An enlarged portion of detail B is reproduced as Figure 6 showing the relative position of flange 25 prior to the attachment of lid 11 to container 12 and after attachment.

The preferred embodiment herein has described the use of eight lugs 16 corresponding to a like number of latches 29. It is to be understood that the number of lugs-and-latches may be varied with the degree of ease or difficulty desired to remove lid 11 from container 12. The embodiments discussed also illustrate lugs 16 as being triangular in shape and nesting within a similarly-shaped portion of each latch 29. It is to be understood that the shapes lugs 16 and the corresponding portion of latches 29 may be varied. For example, it is contemplated that lugs 16 may be formed as round disc-like projections (as shown in Figure 7) or as spherical sections (as shown in Figure 8), while latches 29 may terminate in a rounded cavity accommodating such a spherical or disc-like shape (shown in Figures 7 and 8).

It is also contemplated that the abutment of outer skirt surface 28 with interior container wall 17,

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combined with the overlapping of container lip 18 by flange 25 will provide an improved liquid-tight seal to more positively prevent the leakage of liquid during drinking. A preferred embodiment of the present invention thus contemplates the contact of outer skirt surface 28 along its entire length with interior container wall surface 17.

The closure described hereinabove has been presented as a closure for a child's drinking cup and it should be readily recognized that the same type of closure may be employed for any container with a lid whose removal is to be made more difficult for a variety of purposes.

For example, the closure system described herein may be used to connect a tamper-resistant lid to a medicine bottle or jar to deter young children from gaining access to the medication stored inside. The closure system may also be used in such applications as holding lids to jars containing spices or condiments or, generally, in many applications where a screw-on lid is attached to a threaded neck.

The present closure system may also be adapted to interengage cylindrical members such as pipes. For example, a skirt-and-flange construction can be formed on one end of each pipe, and a set of mating lugs formed on the other end, allowing pipe sections to be coupled end-to-end to form an enclosed channel for fluid flow or for such items as wires or fiber optics cables. Such an arrangement is shown in Figure 9, where latches 40 are formed on the exterior surface 41 of pipe 42, while mating lugs 43 are formed on inner wall 44 of pipe 45. Pipes 42 and 45 may, themselves, be formed from a thermoplastic material, with flange 46 and skirt 47 molded as an integral part of pipe 42. It is to be understood that an end conforming to pipe 42 and an end conforming to pipe 43

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may be formed on the same length of pipe. Such pipes may then be connected as described hereinabove.

The ease or difficulty with which the lid may be removed can be adjusted by, for example, changing the number of lug-and-latch pairs, changing the size and shape of the lugs and changing the shape or thickness of sidewall 13 to control the degree to which flange 25 is flexed with respect to skirt 26.

Lid 11 and container 12 are preferably formed from thermoplastic materials which are sturdy, can flex a great number of times without losing elasticity or memory and which are easy, convenient and inexpensive to mold. Such materials are well-known in the molding art.

While the foregoing has described a particular embodiment of the present invention, it is to be understood that this description is presented by way of example only. It is expected that others, skilled in the art, will perceive of variations which, while differing from the foregoing, do not depart from the spirit and scope of the invention as herein described and claimed. The foregoing description is not meant to limit the scope of the claimed invention in any manner.

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CLAIMS

1. A covered receptacle, comprising an open mouthed container having a generally cylindrical wall terminating at and integral with a base, said container having interior and exterior wall surfaces meeting at said open mouth at a lip which defines the mouth of said container, said container having a plurality of lugs formed on and projecting inwardly from said interior wall surface proximate said lip; a lid for said container, said lid having a top panel terminating in an annular flange depending therefrom, said flange having inner and outer flange walls terminating at an annular flange lip; an annular skirt depending from said top panel and positioned within and coaxial with said flange, said skirt having inner and outer skirt walls terminating at an annular skirt lip, said lid being formed of a flexible thermoplastic material enabling said flange to be flexed with respect to said skirt, said flange and said skirt defining therebetween an annular channel, said channel configured and dimensioned to receive said container lip and a portion of the upper periphery of said container when said lid is placed on said container, latch means formed in said outer skirt wall, said latch means configured and positioned to interengage said lugs when said lid is placed on said container; means to bias said lid away from said container to hold said lugs in interengagement with said latch means; said biasing means including a thickened portion of said upper periphery of said container wall tapering from a relatively narrow configuration at said mouth to a relatively thicker configuration towards said base whereby said flange is flexed outwardly from said skirt when said lid is pressed downwardly onto said container.

2. The apparatus as recited in claim 1 wherein said thermoplastic material is polypropylene.

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3. The apparatus as recited in claim 1 wherein said lugs are formed on said outer skirt wall and said latch means is formed on said interior wall surface.

4. The apparatus as recited in claim 1 wherein said latch means includes a channel molded into the outer surface of said skirt, said channel beginning at said skirt lip and terminating at an end wall, a channel stop member positioned intermediate said end wall and said beginning of said channel.

5. The apparatus as recited in claim 4 wherein said termination of said channel is sized and shaped to form a cavity complementary in size and shape to that of said lug.

6. The apparatus as recited in claim 5 wherein said lug is formed as a triangle.

7. The apparatus as recited in claim 5 wherein said lug is formed as a disk.

8. The apparatus as recited in claim 5 wherein said lug is formed as a spherical section.

9. The apparatus as recited in claim 3 wherein said upper container wall periphery is tapered at an angle of seven degrees with respect to said inner wall surface.

10. The apparatus as recited in claim 1 wherein said outer skirt wall and said inner container wall contact one another along substantially the entire length of said skirt wall when said lid is assembled to said container to form a liquid-tight seal.

11. The apparatus as recited in claim 1 wherein said container has eight such lugs formed thereon and said lid has eight such latch means formed thereon.

12. Means for interconnecting a first generally cylindrical member to a second member of substantially identical cross-sectional configuration as said first member, said interconnecting means comprising a generally cylindrical wall formed on said first member, said cylindrical wall having interior and exterior wall

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surfaces meeting at a lip which defines a mouth of said first member, a plurality of lugs formed on and projecting inwardly from said interior wall surface proximate said lip; a generally cylindrical flange formed on said second member having inner and outer flange walls terminating at an annular flange lip; an annular skirt joined to and positioned within and coaxial with said inner flange wall, said skirt having inner and outer skirt walls terminating at an annular skirt lip, said flange being formed of a flexible thermoplastic material enabling said flange to be flexed with respect to said skirt, said flange and said skirt defining therebetween an annular channel, said channel configured and dimensioned to receive said first member lip and a portion of the periphery of said cylindrical wall when said first and second members are interconnected, latch means formed in said outer skirt wall, said latch means configured and positioned to interengage said lugs when said first and second members are interconnected; means to bias said second member away from said first member to hold said lugs in interengagement with said latch means; said biasing means including a thickened portion of said upper periphery of said cylindrical wall tapering from a relatively narrow configuration at said mouth to a relatively thicker configuration away from said mouth whereby said flange is flexed outwardly from said skirt when said first and second members are interconnected.

13. The construction of claim 12 wherein said latch means are formed on said first member interior wall surface and said lugs are formed on said second member outer skirt wall.

14. The construction of claim 12 wherein said first and second members are hollow pipes.

15. A child's drinking cup, comprising a generally cylindrical open-mouthed container having a bottom formed integrally therewith, the mouth of said

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container being defined by a lip, said container having a plurality of lugs formed on and projecting inwardly from the interior of said container proximate said lip, a lid for said container, said lid having a top panel terminating in an annular flange depending therefrom, said flange having inter and outer flange walls terminating at an annular flange lip, said lid having a drinking spout formed integrally therewith, said spout having a drinking passage formed therethrough to communicate to the interior of said container, an annular skirt depending from said top panel and positioned within and coaxial with said flange, said skirt having inter and outer skirt walls terminating at an annular skirt lip, said flange and said skirt defining therebetween an annular channel, said channel figured and dimensioned to receive said container lip and a portion of the upper periphery of said container when said lid is placed on said container, latch means formed in said outer skirt wall, said latch means configured and positioned to interengage said lugs when said lid is placed on said container, means to bias said lid away from said container to hold said lugs in interengagement with said latch means, said biasing means including a thickened portion of said upper periphery of said container wall tapering from a relatively narrow configuration at said lip to a relatively thicker configuration towards said bottom whereby said flange is flexed outwardly from said skirt when said lid is pressed onwardly onto to said container.

16. The apparatus as recited in claim 15 wherein said latch means includes a channel molded into the outer surface of said skirt, said channel beginning at said skirt lip and terminating at an end wall, a channel stop member positioned intermediate said end wall and said beginning of said channel.

17. The apparatus as recited in claim 16 wherein said termination of said channel is sized and shaped to

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form a cavity complementary in size and shape to that of said lug.

18. The apparatus as recited in claim 17 wherein said lug is formed as a triangle.

19. The apparatus as recited in claim 17 wherein said lug is formed as a disk.

20. The apparatus as recited in claim 17 wherein said lug is formed as a spherical section.

21. The apparatus as recited in claim 15 wherein said outer skirt wall and said inner container wall contact one another along substantially the entire length of said skirt wall when said lid is assembled to said container to form a liquid-tight seal.

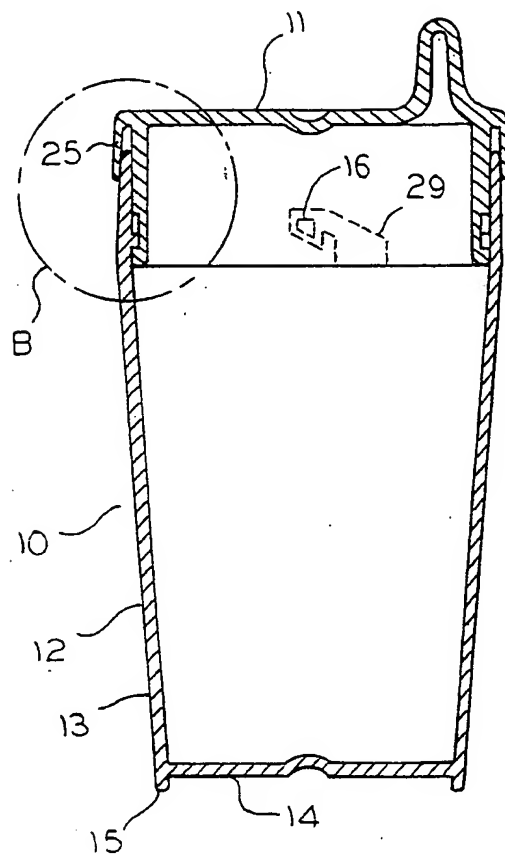


FIG. 1

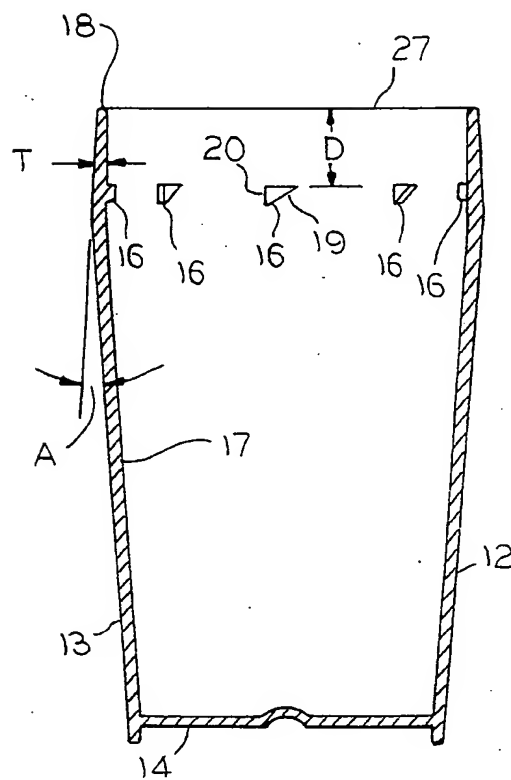


FIG. 2

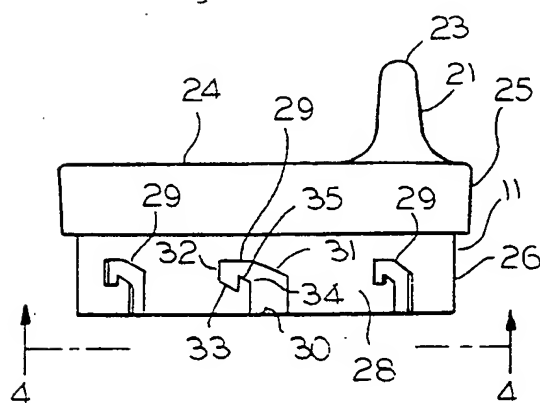


FIG. 3

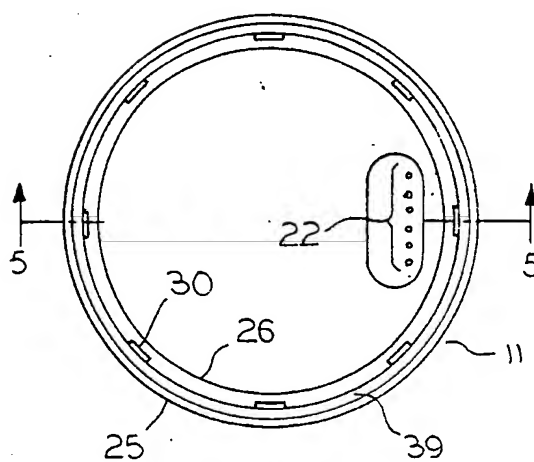


FIG. 4

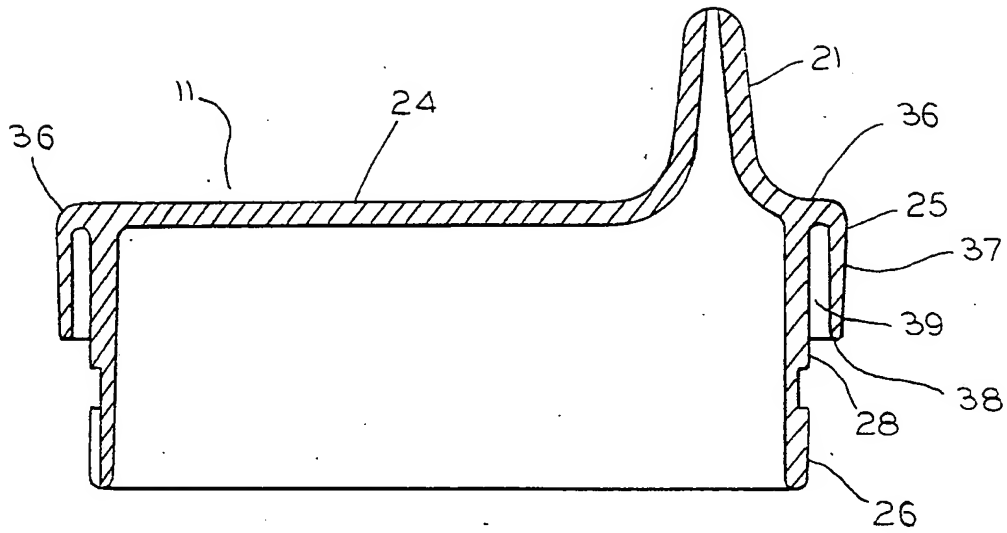


FIG. 5

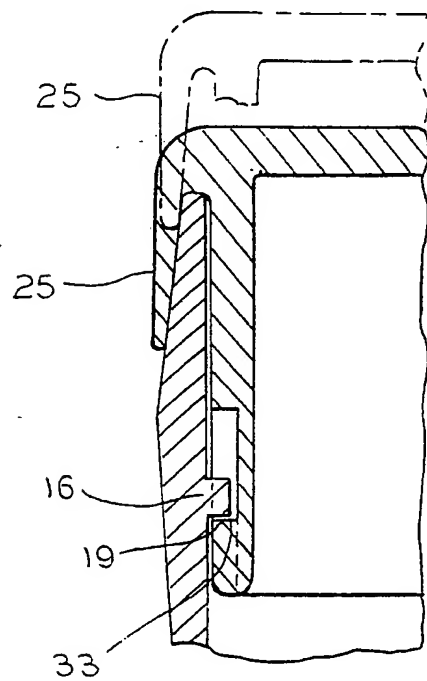


FIG. 6

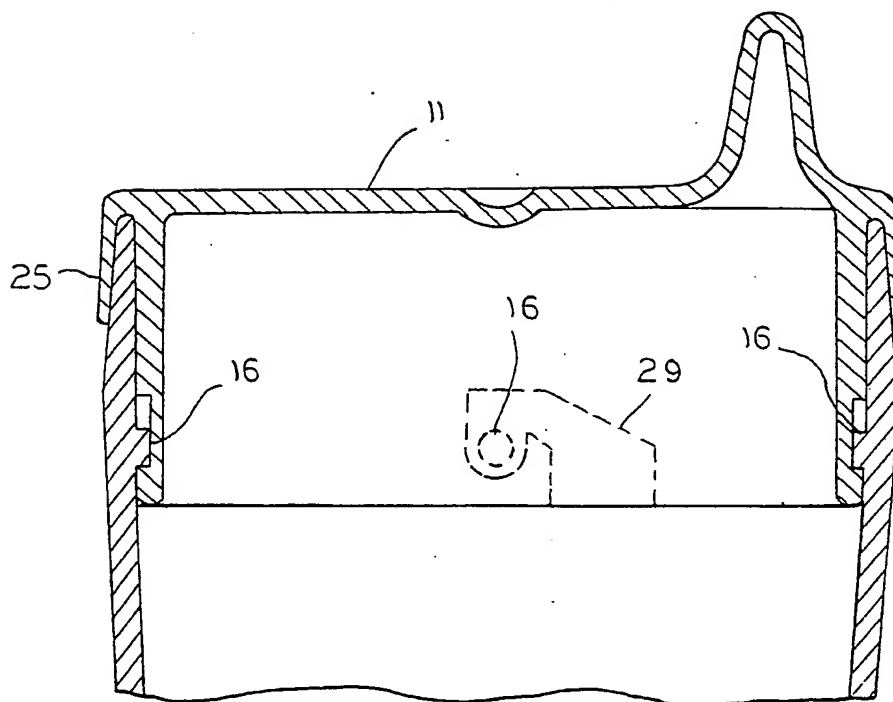


FIG. 7

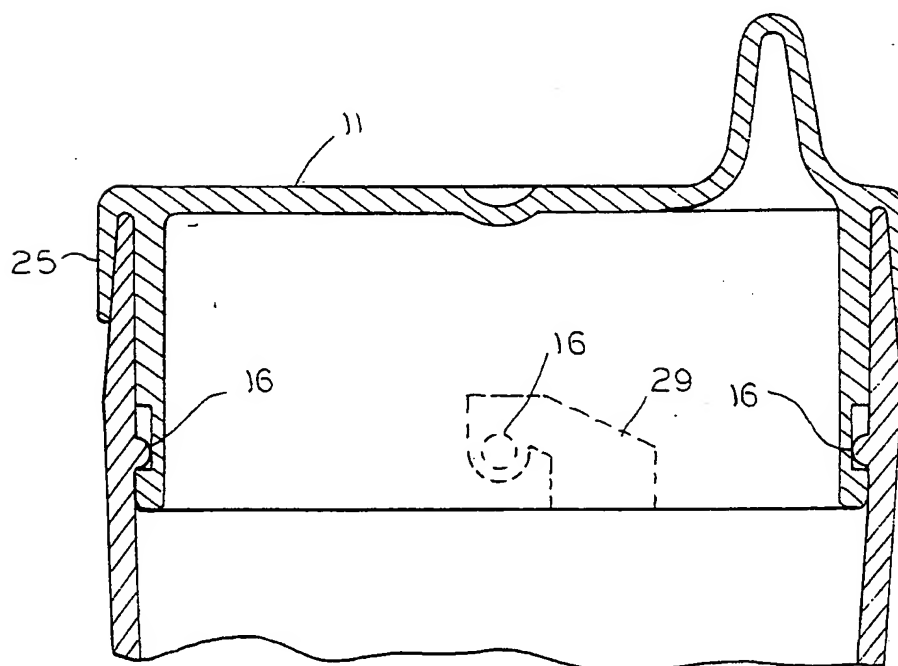
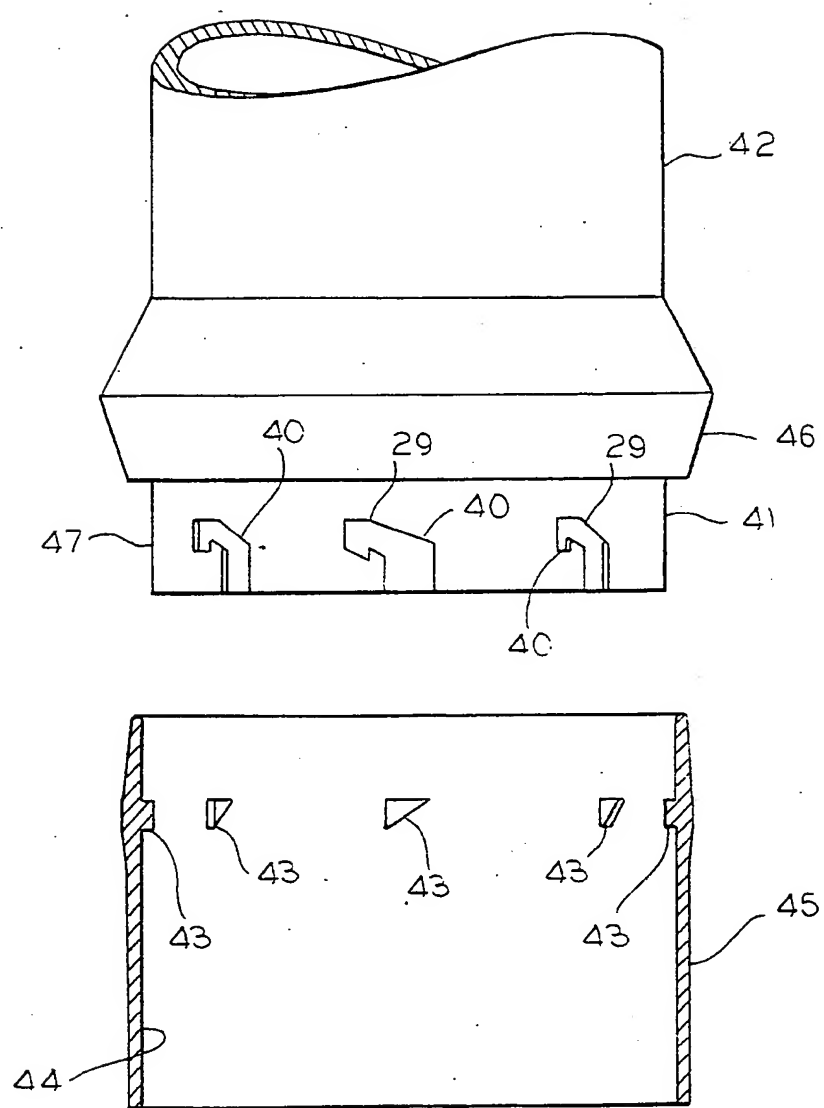


FIG. 8

FIG. 9



INTERNATIONAL SEARCH REPORT

PCT/US 92/03375

International Application No

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int.Cl. 5 A47G19/22; B65D43/04; F16L37/24		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
Int.Cl. 5	A47G ; B65D ; F16L ; A47J	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹		
Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	CA,A,1 060 385 (INTERNATIONAL TOOLS LIMITED) 14 August 1979 see page 6, line 30 - page 10, line 3; figures 3,4	1-13
Y	---	15-21
Y	US,A,4 850 496 (RUDELL ET AL.) 25 July 1989 cited in the application see column 4, line 9 - column 4, line 39; figures 6-8	15-21
A	FR,A,570 831 (VENDRIN) 7 May 1924 see the whole document	1,3,4, 12,15

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<p>¹⁰ Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
25 SEPTEMBER 1992	12. 10. 92	
International Searching Authority	Signature of Authorized Officer	
EUROPEAN PATENT OFFICE	VISTISEN L. <i>Vistisen</i>	

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category ^a	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
A	FR,A,2 204 775 (JOHNS-MANSVILLE CORPORATION) 24 May 1974	12-14
A	CH,A,107 687 (ODONI) 1 November 1924	---
A	US,A,4 830 206 (FISHER) 16 May 1989 cited in the application	-----

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO. US 9203375
SA 60527**

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information. 25/09/92

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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US-A-4850496	25-07-89	None	
FR-A-570831		None	
FR-A-2204775	24-05-74	US-A- 3813115	28-05-74
		AU-A- 6148173	17-04-75
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CH-A-107687		None	
US-A-4830206		US-A- 4789057	06-12-88